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REMARKS

This is a full and timely response to the non-final Official Action mailed June 22, 2006. Reconsideration of the application in light of the above amendments and the following remarks is respectfully requested.

Claim Status:

Claims 18-20 and 26-30 were withdrawn under a previous Restriction Requirement. To expedite the prosecution of this application, claims 18-20 and 26-30 are now cancelled herein. The withdrawn claims are cancelled without prejudice or disclaimer. Applicant reserves the right to file any number of continuation or divisional applications to the withdrawn claims or to any other subject matter described in the present application.

By the forgoing amendment, the specification and various claims have been amended. Additionally, new claims 31-38 have been added. Thus, claims 1-17, 21-25 and 31-38 are currently pending for further action.

Prior Art:

Claims 1, 14, 21 and 25 were rejected under 35 U.S.C. § 102(e) as anticipated by U.S. Patent No. 6,838,035 to Ederer et al. ("Ederer"). For at least the following reasons, this rejection is respectfully traversed.

Claim 21 recites:

A method of forming a three-dimensional object comprising:  
ejecting drops of liquefied material into a vat using an ejector;  
scanning the ejector in first and second mutually opposed directions to deposit  
and solidify said drops in a predetermined pattern to sequentially form layers of the  
three-dimensional object;

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supplying a viscous liquid into the vat to a level which is essentially level with the top of a most recently formed layer of the three-dimensional object, *wherein said viscous liquid both supports the material being formed into a three-dimensional object and fills in voids between drops of the material forming the three-dimensional object*; and

*removing the object from the viscous liquid in the vat and then solidifying the viscous liquid remaining in the voids between solidified drops of the material forming the object.*

(Emphasis added).

Support for the amendment to claim 21 can be found in Applicant's originally-filed specification at, for example, paragraph 0023.

In contrast, Ederer and the other prior art of record fail to teach or suggest a method that includes "supplying a viscous liquid into the vat to a level which is essentially level with the top of a most recently formed layer of the three-dimensional object, wherein said viscous liquid both supports the material being formed into a three-dimensional object and fills in voids between drops of the material forming the three-dimensional object; and removing the object from the viscous liquid in the vat and then solidifying the viscous liquid remaining in the voids between solidified drops of the material forming the object."

"A claim is anticipated [under 35 U.S.C. § 102] only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987) (emphasis added). See M.P.E.P. § 2131. For at least these reasons, the rejection of claim 21 and its dependent claims should be reconsidered and withdrawn.

Claim 1 recites:

A stereolithographic method of forming three-dimensional structure comprising:

a) *ejecting drops of first and second different liquefied materials in a pattern and allowing the drops to solidify to form a layer of a three-dimensional object,*

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wherein the second liquefied material is deposited to form portions of the layers which define an external surface of the three-dimensional object;

b) surrounding the layer with a viscous liquid and controlling the level of the viscous liquid to be essentially level with the uppermost level of the portion of the layer formed from the drops of liquefied material;

c) ejecting drops of the first and second liquefied materials in a pattern and allowing the drops to solidify and form another layer of the three-dimensional object;

d) raising the level of the viscous liquid to a level proximate the uppermost level of the newly formed layer; and

e) repeating steps c) and d).

(Emphasis added).

Support for the amendment to claim 21 can be found in Applicant's originally-filed specification at, for example, paragraph 0013.

In contrast, Ederer and the other prior art of record fail to teach or suggest a method that includes ejecting drops of first and second different *liquefied* materials in a pattern and allowing the drops to solidify to form a layer of a three-dimensional object, wherein the second liquefied material is deposited to form portions of the layers which define an external surface of the three-dimensional object.. For at least this reasons, the rejection of claim 1 based solely on Ederer should be reconsidered and withdrawn.

However, in this regard, the Office Action has referred to U.S. Patent No. 6,405,095 to Jang et al. ("Jang") as teaching the deposition of two different materials in a rapid prototyping system. (Action of 6/22/06, p. 6). However, Jang also does not teach or suggest "ejecting drops of first and second different liquefied materials." Rather, Jang teaches ejecting one liquid material and ejecting one powdered material into a heated zone to form a weld pool. (Jang, col. 11, lines 19-36). Thus, even if Jang were applied against amended claim 1, a combination of Ederer and Jang would still fail to teach or suggest all the features of amended claim 1. Moreover, it is unclear how the weld pool taught by Jang could possibly be combined with the incompatible teachings of Ederer if such a combination were proposed.

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Claims 2, 4, 8-10, 12 and 22 were rejected under 35 U.S.C. § 103(a) over the combined teachings of Ederer and Jang. This rejection is respectfully traversed for the same reasons given above with respect to the independent claims.

Claims 3, 5-7, 11, 13, 23 and 24 were rejected under 35 U.S.C. § 103(a) over the combined teachings of Ederer, Jang and U.S. Patent No. 5,301,415 to Prinz et al. ("Prinz"). This rejection is respectfully traversed for the same reasons given above with respect to the independent claims.

Additionally, claim 7 recites "further comprising the step of heating the three-dimensional object to a degree sufficient to alloy the solidified drops of the first and second materials." Claim 24 recites "heat treating the first and second materials and forming an alloy of the same."

In this regard, the Office Action fails to indicate how or where the cited prior art teaches heating a newly-formed three-dimensional object sufficient to alloy first and second materials used to form the object. The Office Action merely concludes that "[i]t would be further obvious that sufficiently increased heat would bring about molecular diffusion resulting in alloy formation." (Action of 6/22/08). While it is true that given enough heat two metals will form an alloy, mere recognition of this fact is insufficient to support a rejection of claim 7.

First, the cited prior art does not appear to teach or suggest, or at least the Office Action has not shown in the prior art, the use of two metals in a stereolithographic method that could form an alloy. More importantly, the prior art does not teach or suggest, and the Office Action fails to indicate a teaching or suggestion in the prior art, of the claimed method

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including heating a three-dimensional object being formed to a degree sufficient to alloy the first and second build materials. The statement cited above from the Office Action that sufficient heat can bring about molecular diffusion resulting in alloy formation is entirely irrelevant given the absence of any such teaching or suggestion in the cited prior art.

To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). M.P.E.P. § 2143.03. Accord. M.P.E.P. § 706.02(j). For at least these reasons, the rejection based on Ederer, Jang and Prinz should be reconsidered.

Claim 11 recites "heating the thermoplastic resin so that it flows into the small voids between hardened drops of the UV settable resin." Claim 13 recites "heating the metal so that it softens and flows into the small voids between hardened drops of the resin." The recent Office Action fails to indicate how or where this subject matter is taught or suggested by the prior art of record. The cited prior art does not appear to teach or suggest the use of both thermoplastic and UV settable resins (claim 11) or of a metal and resin (claim 13). For at least these additional reasons, the rejection based on Ederer, Jang and Prinz should be reconsidered.

Claims 15-17 were rejected under 35 U.S.C. § 103(a) over the combined teachings of Ederer and U.S. Patent No. 5,510,066 to Fink et al. ("Fink"). This rejection is respectfully traversed for the same reasons given above with respect to the independent claims.

Additionally, claim 15 recites "using the viscous liquid as an impregnation material which enters voids which are formed between solidified drops of the liquefied material." The recent Office Action concedes that "Ederer does not teach the viscous liquid entering the

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voids formed between the drops of the deposit liquid.” (Action of 6/22/06, p. 9).

Consequently, the Action cites to Fink in this regard. However, Fink does not teach or suggest the claimed viscous liquid that surrounds a layer of a three-dimensional object being formed and then acts as an impregnation material which enters voids which are formed between solidified drops of the material used to form the object.

Fink appears to teach applying drops of material in order to build layers of an object. (Fink, col. 3, lines 16-40), but does not teaching or suggest “surrounding the layer with a viscous liquid” or “using the viscous liquid as an impregnation material which enters voids which are formed between solidified drops of the liquefied [build] material.” Again, “[t]o establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974).” M.P.E.P. § 2143.03. Accord. M.P.E.P. § 706.02(j). For at least these reasons, the rejection based on Ederer and Fink should be reconsidered.

Claim 17 recites “wherein at least the viscous material which has entered the voids is hardened to increase smoothness of the external surface of the three-dimensional object.” In contrast, the combination of Ederer and Fink fails to teach or suggest hardening the viscous material that has entered the voids to increase smoothness of the external surface of the resulting object. Again, “[t]o establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974).” M.P.E.P. § 2143.03. Accord. M.P.E.P. § 706.02(j). For at least these additional reasons, the rejection based on Ederer and Fink should be reconsidered.

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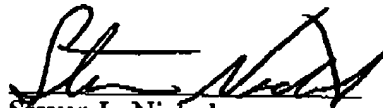
Conclusion:

The newly added claims are thought to be patentable over the prior art of record for at least the same reasons given above with respect to the original independent claims. Moreover, the new claims are thought to recite further subject matter that is not taught or suggested by the prior art of record. Therefore, examination and allowance of the newly added claims is respectfully requested.

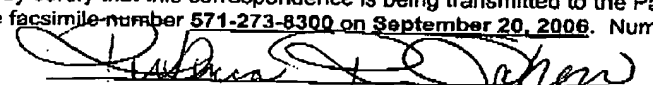
For the foregoing reasons, the present application is thought to be clearly in condition for allowance. Accordingly, favorable reconsideration of the application in light of these remarks is courteously solicited. If the Examiner has any comments or suggestions which could place this application in even better form, the Examiner is requested to telephone the undersigned attorney at the number listed below.

Respectfully submitted,

DATE: September 22, 2006

  
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<p align="center"><b>CERTIFICATE OF TRANSMISSION</b></p> <p>I hereby certify that this correspondence is being transmitted to the Patent and Trademark Office facsimile number <b>571-273-8300</b> on <b>September 20, 2006</b>. Number of Pages: <b>18</b></p>  Rebecca R. Schow
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